



Wessex
Learning Trust
We Learn Together!

Calculation Policy: EYFS

Mathematical Manipulatives

Key Representations

Progression in Procedures





Key vocabulary

General number vocabulary: numeral, counting, subitising, comparing, more than, fewer than, pattern

Addition: add, plus, altogether, total, more, whole

Subtraction: less, subtract, take away, fewer, part, difference

Multiplication: double, pairs, equal groups

Division: share, fair, same amount, equal groups, enough

Fractions: whole, part, equal, half

Manipulatives: counters, cubes, Numicon, fingers, real-life objects, shapes, rekenreks blocks, loose parts

Representations: ten frames, dot patterns, fingers, part-part-whole diagrams, Number blocks, fingers, rekenreks, Hungarian tens frame (double die frame)



EYFS ADDITION

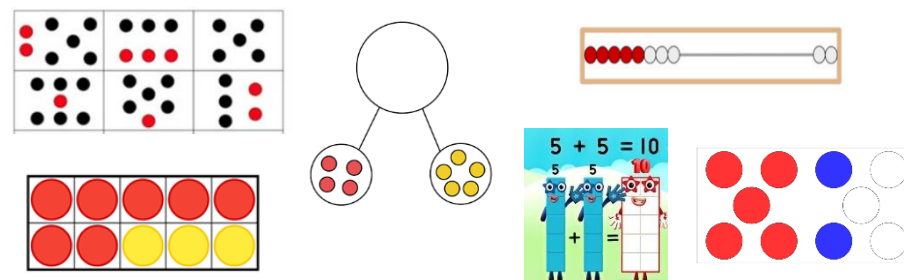
Manipulatives

The recommended manipulatives include counters, cubes, Numicon, fingers, real-life objects, rekenreks and loose parts.



Representations

The key representations used are Hungarian tens frames (double die frame), ten frames, dot patterns, fingers, part-part-whole diagrams, rekenreks and Numberblocks.



Factual knowledge

The key factual knowledge includes:

- Number bonds within 5
- Numbers bonds within 10
- Composition of numbers within 10

Procedural knowledge

The key methods include:

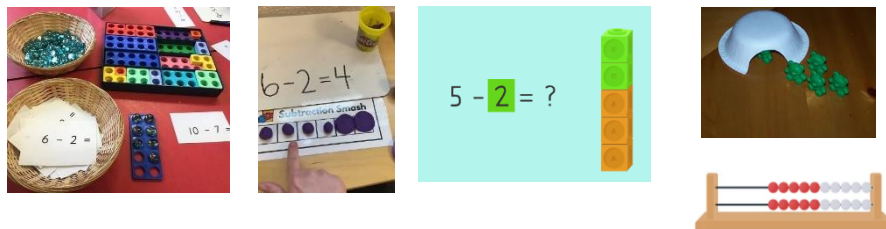
- Combining groups
- Answering 'How many are there altogether?'
- Practical number stories
- Play-based exploration



EYFS SUBTRACTION

Manipulatives

The recommended manipulatives are counters, cubes, real-life objects, Numicon, rekenreks and loose parts.



Representations

The key representations used are ten frames, fingers, Numberblocks, rekenreks and part-part-whole diagrams.



Factual knowledge

The key factual knowledge includes:

- Understanding that quantities decrease
- Understand that numbers can be partitioned into parts
- Number bonds to 5 and 10
- Composition of numbers within 10

Procedural knowledge

The key methods include:

- Taking objects away – how many are left?
- Practical stories and songs
- Partitioning and recombining numbers



EYFS MULTIPLICATION

Manipulatives

The recommended manipulatives are counters, cubes, Numicon, real-life objects, fingers, rekenreks and loose parts.



Representations

The key representations used are Hungarian tens frames (double die frame), fingers, tens frames, Numicon, rekenreks and Numberblocks.



Factual knowledge

The key factual knowledge includes:

- Know doubles within 10
- Understand what equal means
- Know why numbers are sorted into odds and evens

Procedural knowledge

The key methods include:

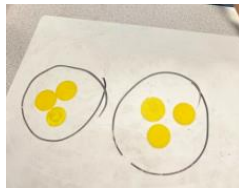
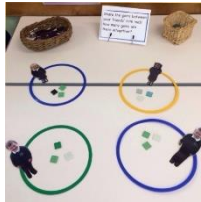
- Doubling quantities
- Identifying equal and not equal groups
- Making equal groups (through practical exploration)
- Sorting numbers into odds and evens



EYFS DIVISION

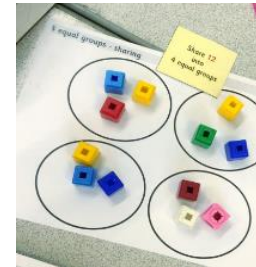
Manipulatives

The recommended manipulatives are counters, cubes, real-life objects (e.g. snack, animals) and loose parts.



Representations

The key representations used are sharing circles / plates / hoops.



Factual knowledge

The key factual knowledge includes:

- Understanding that objects can be shared between people or groups
- Recognising equal and unequal groups

Procedural knowledge

The key methods include:

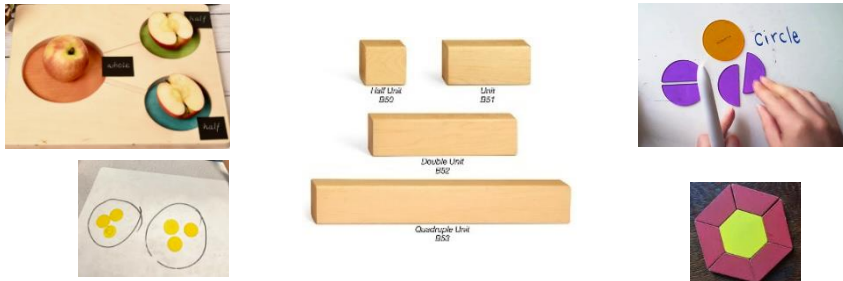
- Sharing fairly - is there enough for everyone?
- Checking that each group has the same amount.



EYFS FRACTIONS

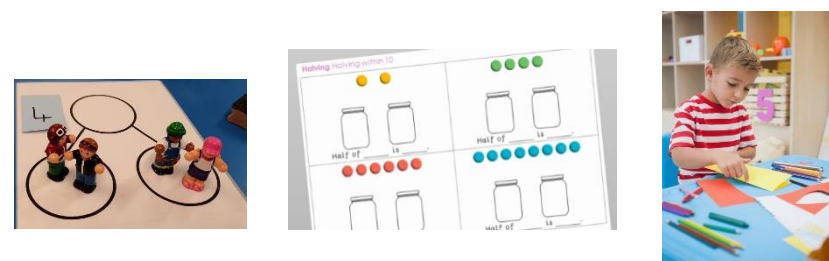
Manipulatives

The recommended manipulatives are real-life objects (e.g. food), shapes, counters and wooden blocks.



Representations

The key representations are part-part-whole diagrams, objects being shared equally and folding paper shapes in half.



Factual knowledge

The key factual knowledge includes:

- Understanding what the whole is
- Understanding that 2 parts must be equal to be halves of a whole

Procedural knowledge

The key methods include:

- Folding shapes
- Sharing equally
- Identifying halves in practical contexts



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Calculation Policy: Y1

Mathematical Manipulatives

Key Representations

Progression in Procedures





Key vocabulary

Place value: ones, tens, column, numeral, equal to, unequal, more than, less than (fewer), most, least, odd, even

Addition: sum, addend, add, put together, altogether, total

Subtraction: difference, subtrahend, subtract, partition, take away, more than and less than

Multiplication: multiples, array, groups of, double

Division: divide, share, group, halve

Fractions: equal part, whole

Manipulatives: place value counters, Dienes, 10-frame, Cuisinière rods, Numicon

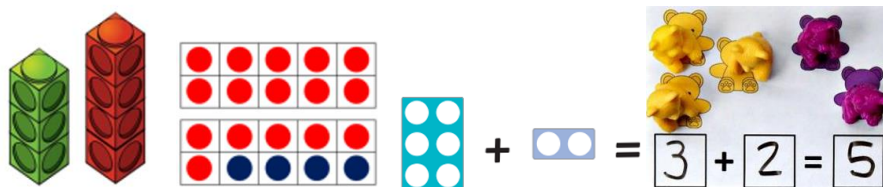
Representations: represent, representation, number line, array, row/column, Part-Part-Whole diagram, bar model



YEAR 1 ADDITION

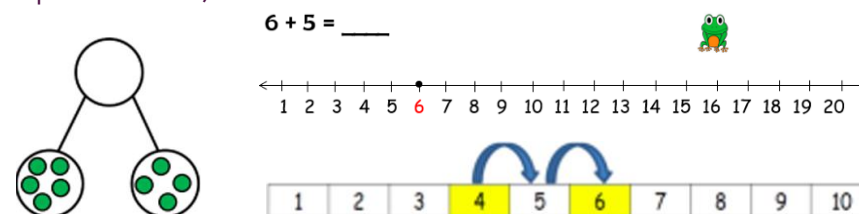
Manipulatives

The recommended manipulatives (physical resources) for adding 1-or 2-digit numbers to 20 are: counters, cubes, 10 frames, numicon and real life objects.



Representations

The key representations used are, number tracks, populated number lines, blank number lines and part-part-whole diagrams(which encourage children to apply their knowledge of place value).



Factual knowledge

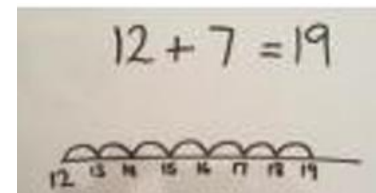
The key factual knowledge includes recall of addition/subtraction facts to 20, doubling/halving facts to 20.

Number Bonds	
Story to 10	
2 + 8 = 10	3 + 7 = 10
4 + 6 = 10	5 + 5 = 10
6 + 4 = 10	7 + 3 = 10
8 + 2 = 10	9 + 1 = 10
10 + 0 = 10	0 + 10 = 10

Number Bonds to 20	
There are 21 ways to make 20.	
0+20 = 20	20+0 = 20
1+19 = 20	19+1 = 20
2+18 = 20	18+2 = 20
3+17 = 20	17+3 = 20
4+16 = 20	16+4 = 20
5+15 = 20	15+5 = 20
6+14 = 20	14+6 = 20
7+13 = 20	13+7 = 20
8+12 = 20	12+8 = 20
9+11 = 20	11+9 = 20
10+10 = 20	

Procedural knowledge

The key method used is a blank number line. Children are encouraged to draw their own number line alongside physical resources

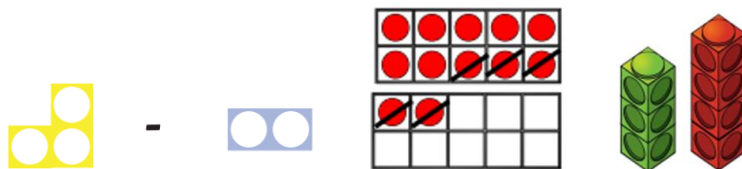




YEAR 1 SUBTRACTION

Manipulatives

The recommended manipulatives (physical resources) for subtracting 1 or 2-digit numbers to 20 are ten frames, counters, snap cubes and Numicon.



Representations

The key representations used are populated number lines, part-part whole models, real life objects and bar models (which encourage children to apply their knowledge of place value).



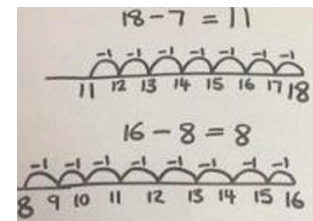
Factual knowledge

The key factual knowledge includes recall of addition/subtraction facts to 20, doubling/halving facts to 20.

Addition and Subtraction Facts to 20			
20 + 0 = 20	0 + 20 = 20	20 - 0 = 20	20 - 20 = 0
19 + 1 = 20	1 + 19 = 20	20 - 1 = 19	20 - 19 = 1
18 + 2 = 20	2 + 18 = 20	20 - 2 = 18	20 - 18 = 2
17 + 3 = 20	3 + 17 = 20	20 - 3 = 17	20 - 17 = 3
16 + 4 = 20	4 + 16 = 20	20 - 4 = 16	20 - 16 = 4
15 + 5 = 20	5 + 15 = 20	20 - 5 = 15	20 - 15 = 5
14 + 6 = 20	6 + 14 = 20	20 - 6 = 14	20 - 14 = 6
13 + 7 = 20	7 + 13 = 20	20 - 7 = 13	20 - 13 = 7
12 + 8 = 20	8 + 12 = 20	20 - 8 = 12	20 - 12 = 8
11 + 9 = 20	9 + 11 = 20	20 - 9 = 11	20 - 11 = 9
10 + 10 = 20	10 + 10 = 20	20 - 10 = 10	20 - 10 = 10

Procedural knowledge

The key method (procedural knowledge) is a blank number line. Children are encouraged to draw their own blank number line alongside physical resources.

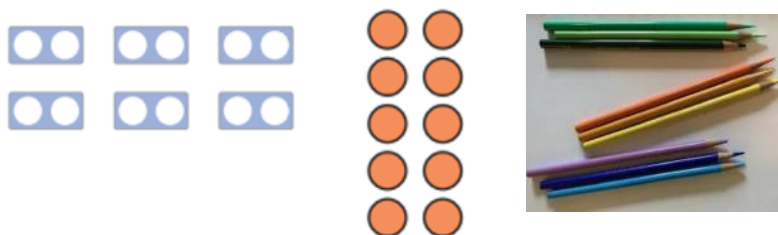




YEAR 1 MULTIPLICATION

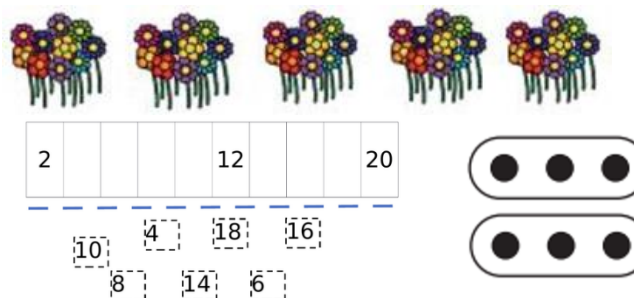
Manipulatives

The recommended manipulatives (physical resources) for solving 1-step problems involving multiplication are Numicon, counters, cubes and real-life objects.



Representations

The key representations used are arrays, real-life objects and partially completed number tracks.



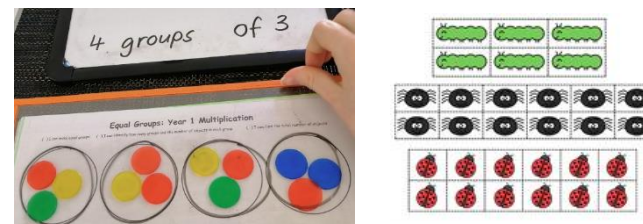
Factual knowledge

The key factual knowledge (non-statutory) includes counting in 2s, 5s and 10s.



Procedural knowledge

There is no specific key procedural knowledge. Children are encouraged to group and share concrete objects, use pictorial representations and arrays with the support of the teacher.





YEAR 1 DIVISION

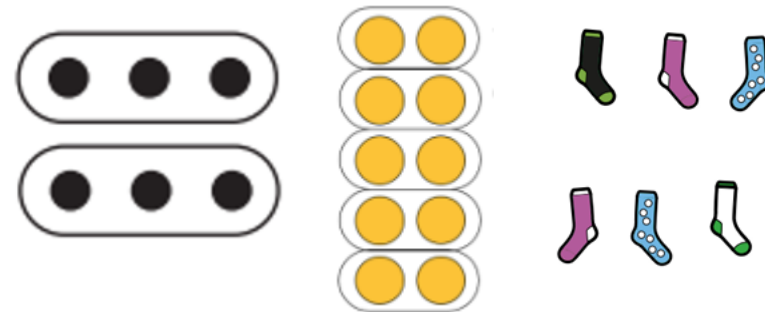
Manipulatives

The recommended manipulatives (physical resources) for one step problems involving division are place value counters and real-life objects.



Representations

The key representations used are arrays and real-life objects.



Factual knowledge

The key factual knowledge (non-statutory) includes counting in 2s, 5s and 10s.



Procedural knowledge

There is no specific key procedural knowledge. Children are encouraged to group and share concrete objects, use pictorial representations and arrays with the support of the teacher.





YEAR 1 FRACTIONS

Manipulatives

The recommended manipulatives (physical resources) for fractions are counters or real-life objects.



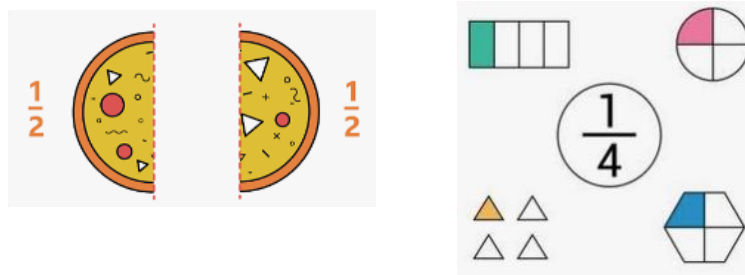
Representations

The key representations are shapes, bar models and arrays.



Factual knowledge

Children must be able to name a half as one of two equal parts and name a quarter as one of four equal parts.



Procedural knowledge



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Calculation Policy: Y2

Mathematical Manipulatives

Key Representations

Progression in Procedures





Key vocabulary

Place value: ones, tens, hundreds, column, numeral, digit, facts, greater than, less than, equal to

Addition: sum, addend, add, total, altogether, inverse, commutative

Subtraction: difference, subtrahend, minuend, subtract, partition, difference, inverse

Multiplication: product, multiplicand, multiplier, multiply, multiple, repeated addition, factor

Division: quotient, dividend, divisor, divide, repeated subtraction

Fractions: denominator, numerator, equal part, whole, equivalent, ascending, descending

Manipulatives: place value counters, Dienes, 10-frame

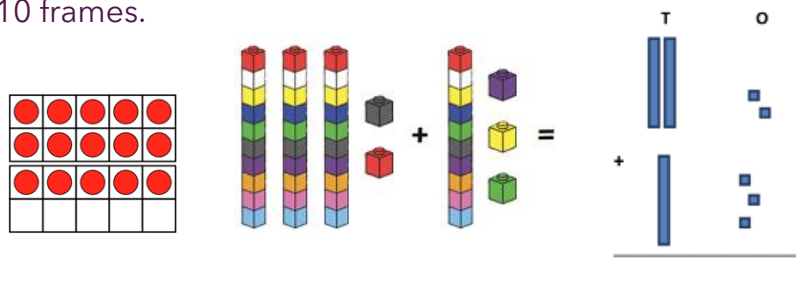
Representations: represent, representation, number line, array, row/column, Part-Part-Whole diagram, bar model



YEAR 2 ADDITION

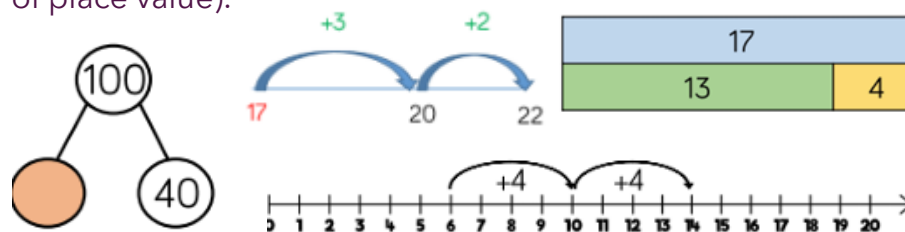
Manipulatives

The recommended manipulatives (physical resources) for adding two 2-digit numbers are Counters, cubes, dienes and 10 frames.



Representations

The key representations used are Populated and blank number lines, bar models and part-part-whole diagrams (which encourage children to apply their knowledge of place value).



Factual knowledge

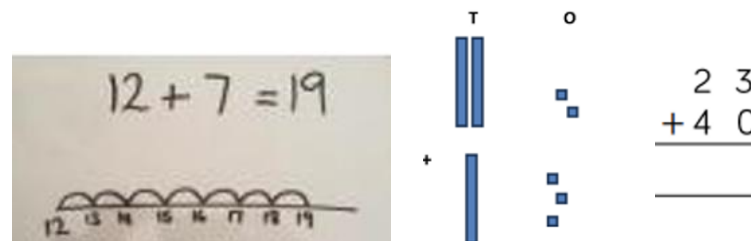
The key factual knowledge includes recall of addition/subtraction facts to 20 (and related facts), doubling/halving facts to 20.

facts such as using $3 + 7 = 10$; $10 - 7 = 3$
 $30 + 70 = 100$; $100 - 70 = 30$ and $70 = 100 - 30$.

	0	1	2	3	4	5	6	7	8	9	10
0	0+0	0+1	0+2	0+3	0+4	0+5	0+6	0+7	0+8	0+9	0+10
1	1+0	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9	1+10
2	2+0	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8	2+9	2+10
3	3+0	3+1	3+2	3+3	3+4	3+5	3+6	3+7	3+8	3+9	3+10
4	4+0	4+1	4+2	4+3	4+4	4+5	4+6	4+7	4+8	4+9	4+10
5	5+0	5+1	5+2	5+3	5+4	5+5	5+6	5+7	5+8	5+9	5+10
6	6+0	6+1	6+2	6+3	6+4	6+5	6+6	6+7	6+8	6+9	6+10
7	7+0	7+1	7+2	7+3	7+4	7+5	7+6	7+7	7+8	7+9	7+10
8	8+0	8+1	8+2	8+3	8+4	8+5	8+6	8+7	8+8	8+9	8+10
9	9+0	9+1	9+2	9+3	9+4	9+5	9+6	9+7	9+8	9+9	9+10
10	10+0	10+1	10+2	10+3	10+4	10+5	10+6	10+7	10+8	10+9	10+10

Procedural knowledge

Children should apply their increasing knowledge of mental and written methods, and recording addition in columns will support place value and prepare for formal written methods.

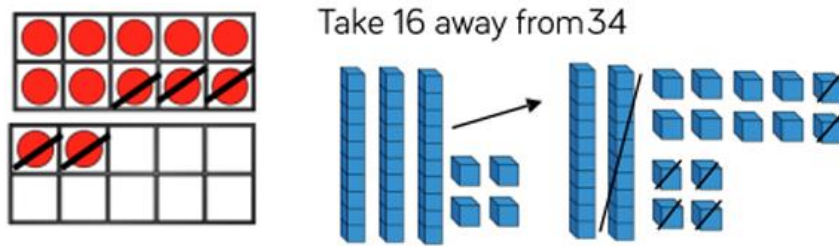




YEAR 2 SUBTRACTION

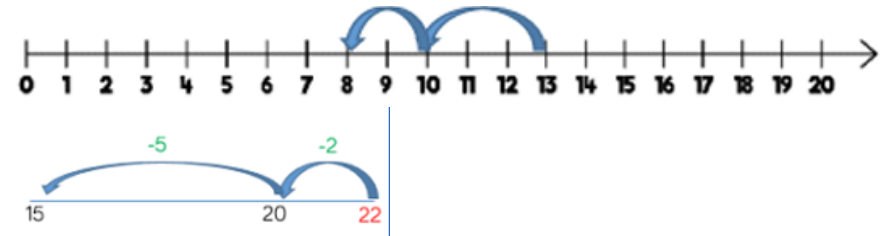
Manipulatives

The recommended manipulatives (physical resources) for subtracting two 2-digit numbers crossing 10 are Dienes and 10 frames.



Representations

The key representations used are Populated and blank number lines and bar models (which encourage children to apply their knowledge of place value).



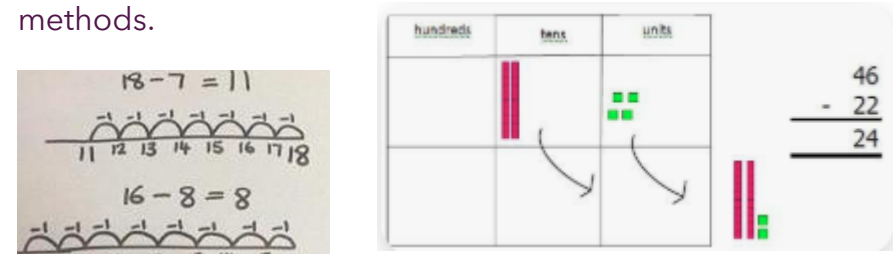
Factual knowledge

The key factual knowledge includes recall of addition/subtraction facts to 20 (and related facts), doubling/halving facts to 20.

10-1	11-2	12-3	13-4	14-5	15-6	16-7	17-8	18-9
9-1	10-2	11-3	12-4	13-5	14-6	15-7	16-8	17-9
8-1	9-2	10-3	11-4	12-5	13-6	14-7	15-8	16-9
7-1	8-2	9-3	10-4	11-5	12-6	13-7	14-8	15-9
6-1	7-2	8-3	9-4	10-5	11-6	12-7	13-8	14-9
5-1	6-2	7-3	8-4	9-5	10-6	11-7	12-8	13-9
4-1	5-2	6-3	7-4	8-5	9-6	10-7	11-8	12-9
3-1	4-2	5-3	6-4	7-5	8-6	9-7	10-8	11-9
2-1	3-2	4-3	5-4	6-5	7-6	8-7	9-8	10-9

Procedural knowledge

Children should apply their increasing knowledge of mental and written methods and recording subtraction in columns will support place value and prepare for formal written methods.

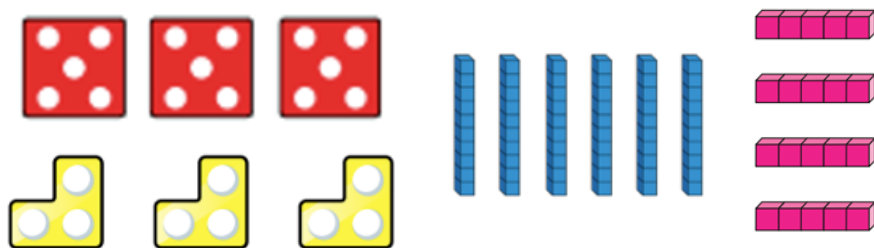




YEAR 2 MULTIPLICATION

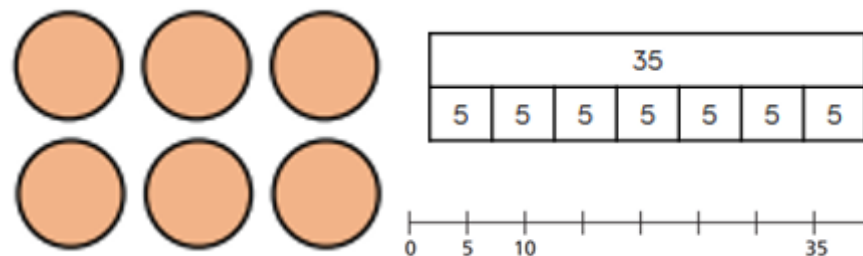
Manipulatives

The recommended manipulatives (physical resources) for calculating statements within the multiplication tables 2, 5 and 10 are Numicon, denies, cubes and dice.



Representations

The key representations used are arrays and bar models and partially completed number lines.



Factual knowledge

The key factual knowledge includes recall of 2, 5 and 10 multiplication tables.

0 x 2 = 0	0 x 5 = 0	0 x 10 = 0
1 x 2 = 2	1 x 5 = 5	1 x 10 = 10
2 x 2 = 4	2 x 5 = 10	2 x 10 = 20
3 x 2 = 6	3 x 5 = 15	3 x 10 = 30
4 x 2 = 8	4 x 5 = 20	4 x 10 = 40
5 x 2 = 10	5 x 5 = 25	5 x 10 = 50
6 x 2 = 12	6 x 5 = 30	6 x 10 = 60
7 x 2 = 14	7 x 5 = 35	7 x 10 = 70
8 x 2 = 16	8 x 5 = 40	8 x 10 = 80
9 x 2 = 18	9 x 5 = 45	9 x 10 = 90
10 x 2 = 20	10 x 5 = 50	10 x 10 = 100
11 x 2 = 22	11 x 5 = 55	11 x 10 = 110
12 x 2 = 24	12 x 5 = 60	12 x 10 = 120

Procedural knowledge

The key methods is repeated addition. It is suggested that the children write the calculation alongside the concrete resources to ensure they can see the link between the two.

$$2 + 2 + 2 = \square$$

$$3 \times 2 = \square$$



YEAR 2 DIVISION

Manipulatives

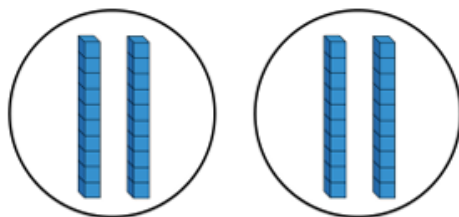
The recommended manipulatives (physical resources) for division are place value counters and Dienes.

$$10 \div 2$$

Sharing



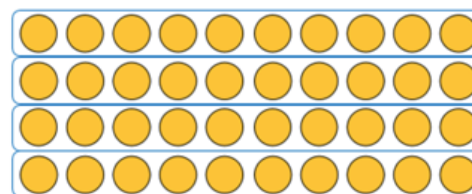
Grouping



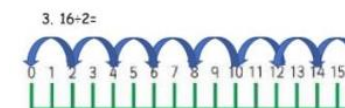
$$40 \div 2 = 20$$

Representations

The key representations used are arrays, bar models and number lines.



12		
4	4	4



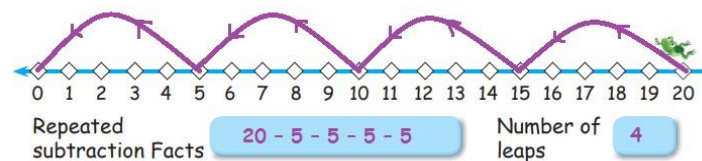
Factual knowledge

The key factual knowledge includes recall of 2, 5 and 10 multiplication tables and their corresponding division facts.

$\square \times 2 = 12$	$2 \times \square = 18$
$\square \times 5 = 15$	$5 \times \square = 25$
$\square \times 2 = 20$	$10 \times \square = 100$
$\square \times 10 = 40$	$\square \times 5 = 10$
$\square \times 5 = 35$	$2 \times \square = 24$
$2 \times \square = 22$	$\square \times 10 = 70$
$10 \times \square = 10$	$5 \times \square = 40$

Procedural knowledge

The key method is repeated subtraction on a number line. And continue to group and share concrete objects, use pictorial representations and arrays.

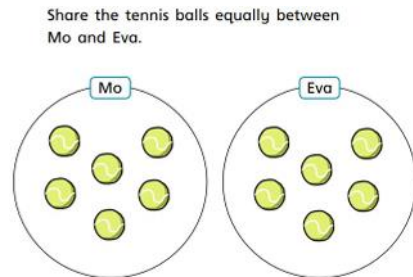




YEAR 2 FRACTIONS

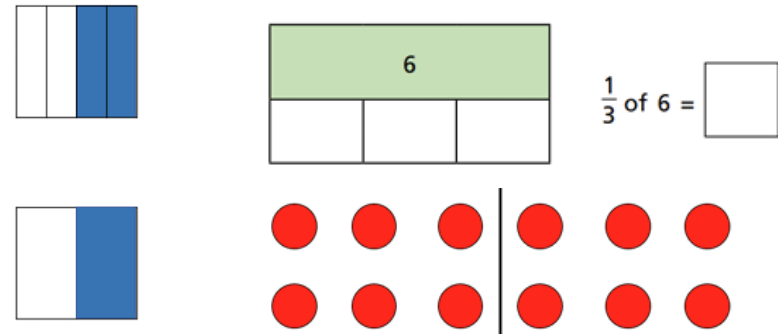
Manipulatives

The recommended manipulatives (physical resources) for fractions are counters or real-life objects.



Representations

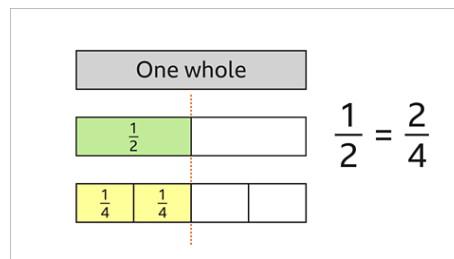
The key representations are shapes, bar models and arrays.



Factual knowledge

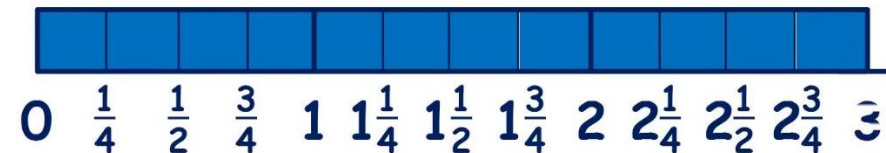
Children must be able to name a half as one of two equal parts and name a quarter as one of four equal parts.

$$\frac{1}{2} = \frac{2}{4}$$



Procedural knowledge

The key procedure is counting up/down in fractions on a number line.





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Calculation Policy: Y3

Mathematical Manipulatives

Key Representations

Progression in Procedures





Key vocabulary

Place value: ones, tens, hundreds, column, numeral, digit, facts, greater than, less than, equal to, multiples

Addition: sum, addend, add, total, altogether, inverse, commutative, partition

Subtraction: difference, subtrahend, minuend, subtract, partition, difference, inverse

Multiplication: product, multiplicand, multiplier, multiply, multiple, repeated addition, factor, scaling

Division: quotient, dividend, divisor, divide, repeated subtraction, related facts

Fractions: denominator, numerator, equal part, whole, equivalent, ascending, descending, unit fraction, non-unit fraction, tenths

Manipulatives: place value counters, Dienes, place value grid

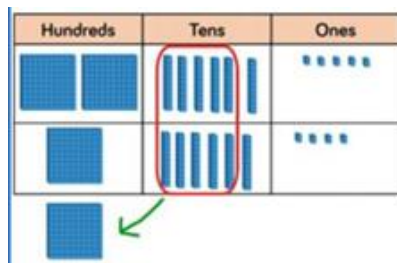
Representations: represent, representation, number line, array, row/column, Part-Part-Whole diagram, bar model



YEAR 3 ADDITION

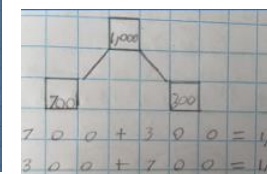
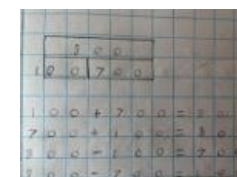
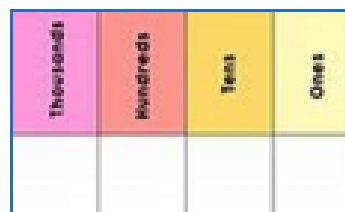
Manipulatives

The recommended manipulatives (physical resources) for adding numbers with up to 3-digits are place value counters and Dienes.



Representations

The key representations used are blank number lines, place value grids, bar models and part-part-whole diagrams (which encourage children to apply their knowledge of place value).



Factual knowledge

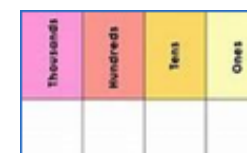
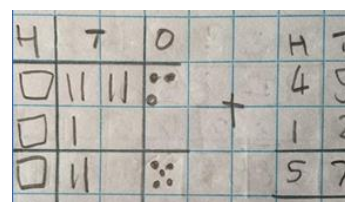
The key factual knowledge includes recall of addition/subtraction facts to 100 (and related facts), doubling/halving facts to 100.

90+10	20+80	30+70
40+60	50+50	60+40
10+90	80+20	70+30
77+23	81+19	35+65

Zero in Addition	Doubles, Doubles Plus One	Add Within Ten (10 as an Addend)									
Counting On: 1, 2, 3; Order Property	Make a Ten (adding 7, 8, 9)										
+	0	1	2	3	4	5	6	7	8	9	10
0	0+0	0+1	0+2	0+3	0+4	0+5	0+6	0+7	0+8	0+9	0+10
1	1+0	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9	1+10
2	2+0	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8	2+9	2+10
3	3+0	3+1	3+2	3+3	3+4	3+5	3+6	3+7	3+8	3+9	3+10
4	4+0	4+1	4+2	4+3	4+4	4+5	4+6	4+7	4+8	4+9	4+10
5	5+0	5+1	5+2	5+3	5+4	5+5	5+6	5+7	5+8	5+9	5+10
6	6+0	6+1	6+2	6+3	6+4	6+5	6+6	6+7	6+8	6+9	6+10
7	7+0	7+1	7+2	7+3	7+4	7+5	7+6	7+7	7+8	7+9	7+10
8	8+0	8+1	8+2	8+3	8+4	8+5	8+6	8+7	8+8	8+9	8+10
9	9+0	9+1	9+2	9+3	9+4	9+5	9+6	9+7	9+8	9+9	9+10
10	10+0	10+1	10+2	10+3	10+4	10+5	10+6	10+7	10+8	10+9	10+10

Procedural knowledge

The key methods is formal column addition. It is suggested that the children write the calculation alongside the concrete resources to ensure they can see the link between the two.





YEAR 3 SUBTRACTION

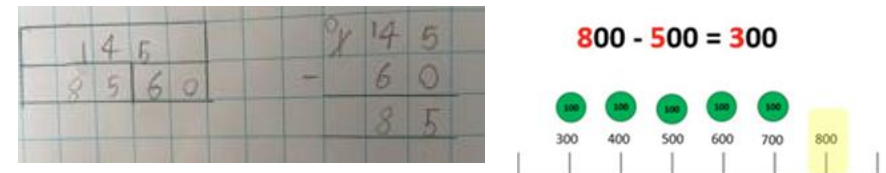
Manipulatives

The recommended manipulatives (physical resources) for subtracting numbers with up to 3-digits are place value counters and Dienes.



Representations

The key representations used are number lines, place value grids, bar models and part-part-whole diagrams(which encourage children to apply their knowledge of place value).



Factual knowledge

The key factual knowledge includes recall of addition/subtraction facts to 20 (and related facts), doubling/halving facts to 20.

10-1	11-2	12-3	13-4	14-5	15-6	16-7	17-8	18-9
9-1	10-2	11-3	12-4	13-5	14-6	15-7	16-8	17-9
8-1	9-2	10-3	11-4	12-5	13-6	14-7	15-8	16-9
7-1	8-2	9-3	10-4	11-5	12-6	13-7	14-8	15-9
6-1	7-2	8-3	9-4	10-5	11-6	12-7	13-8	14-9
5-1	6-2	7-3	8-4	9-5	10-6	11-7	12-8	13-9
4-1	5-2	6-3	7-4	8-5	9-6	10-7	11-8	12-9
3-1	4-2	5-3	6-4	7-5	8-6	9-7	10-8	11-9
2-1	3-2	4-3	5-4	6-5	7-6	8-7	9-8	10-9

$$\begin{array}{l} 74 + \square = 100 \quad \square + 46 = 100 \\ 92 + \square = 100 \quad \square + 28 = 100 \\ 87 + \square = 100 \quad \square + 14 = 100 \end{array}$$

Procedural knowledge

Children should apply their increasing knowledge of mental and written methods and recording subtraction in columns will support place value and prepare for formal written methods.

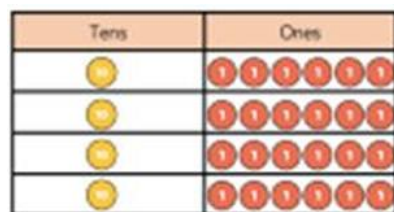
$$\begin{array}{r} 254 \\ - 126 \\ \hline 128 \end{array}$$



YEAR 3 MULTIPLICATION

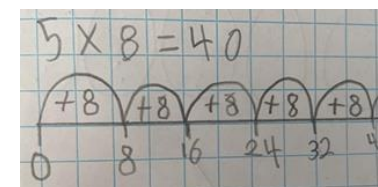
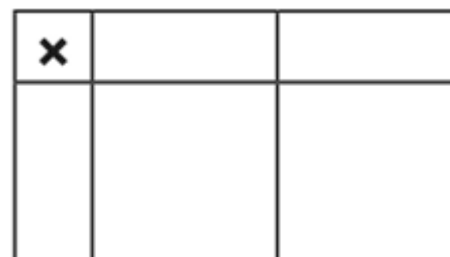
Manipulatives

The recommended manipulatives (physical resources) for multiplying 2- digit numbers by 1 digit numbers are place value counters and Dienes.



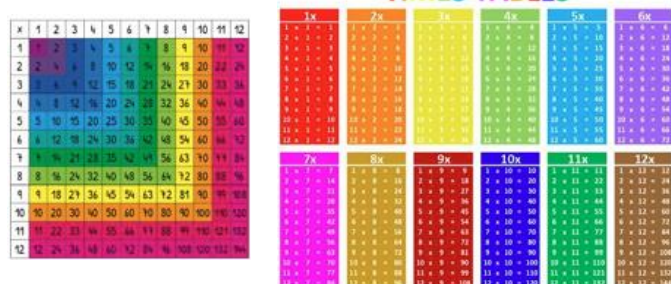
Representations

The key representations used are blank number lines and place value grids.



Factual knowledge

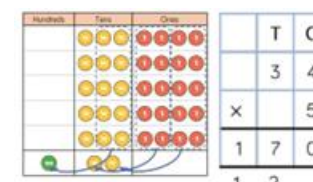
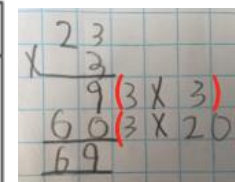
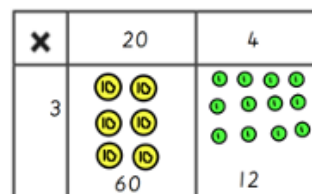
The key factual knowledge includes recall of 2, 3, 4, 5, 8 and 10 multiplication tables and counting in multiples of 50 and 100.



Procedural knowledge

The key methods is repeated addition. It is suggested that the children write the calculation alongside the concrete resources to ensure they can see the link between the two.

$$24 \times 3 = 72$$

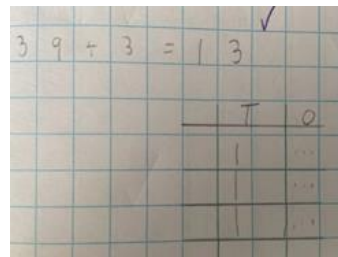
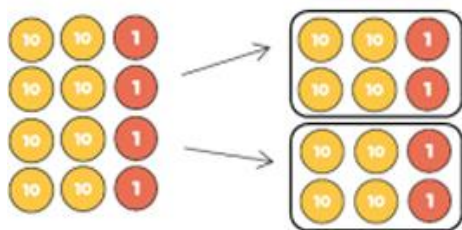




YEAR 3 DIVISION

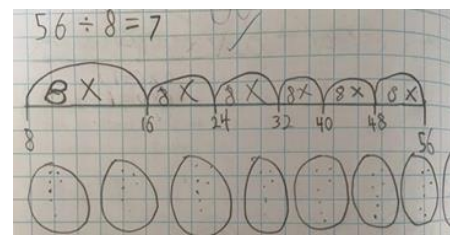
Manipulatives

The recommended manipulatives (physical resources) for Division are place value counters and Dienes.



Representations

The key method is repeated subtraction on a number line. And continue to group and share concrete objects, use pictorial representations and arrays.



Factual knowledge

The key factual knowledge includes recall of 2, 3, 4, 5, 8 and 10 multiplication tables and counting in multiples of 50 and 100.

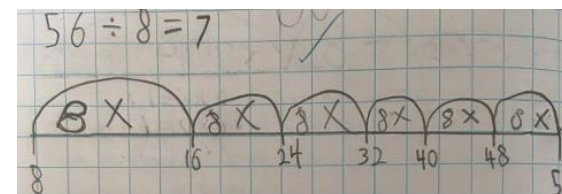
1x	2x	3x	4x	5x	6x
1x1=1	2x1=2	3x1=3	4x1=4	5x1=5	6x1=6
1x2=2	2x2=4	3x2=6	4x2=8	5x2=10	6x2=12
1x3=3	2x3=6	3x3=9	4x3=12	5x3=15	6x3=18
1x4=4	2x4=8	3x4=12	4x4=16	5x4=20	6x4=24
1x5=5	2x5=10	3x5=15	4x5=20	5x5=25	6x5=30
1x6=6	2x6=12	3x6=18	4x6=24	5x6=30	6x6=36
1x7=7	2x7=14	3x7=21	4x7=28	5x7=35	6x7=42
1x8=8	2x8=16	3x8=24	4x8=32	5x8=40	6x8=48
1x9=9	2x9=18	3x9=27	4x9=36	5x9=45	6x9=54
1x10=10	2x10=20	3x10=30	4x10=40	5x10=50	6x10=60
1x11=11	2x11=22	3x11=33	4x11=44	5x11=55	6x11=66
1x12=12	2x12=24	3x12=36	4x12=48	5x12=60	6x12=72

7x	8x	9x	10x	11x	12x
7x1=7	8x1=8	9x1=9	10x1=10	11x1=11	12x1=12
7x2=14	8x2=16	9x2=18	10x2=20	11x2=22	12x2=24
7x3=21	8x3=24	9x3=27	10x3=30	11x3=33	12x3=36
7x4=28	8x4=32	9x4=36	10x4=40	11x4=44	12x4=48
7x5=35	8x5=40	9x5=45	10x5=50	11x5=55	12x5=60
7x6=42	8x6=48	9x6=54	10x6=60	11x6=66	12x6=72
7x7=49	8x7=56	9x7=63	10x7=70	11x7=77	12x7=84
7x8=56	8x8=64	9x8=72	10x8=80	11x8=88	12x8=96
7x9=63	8x9=72	9x9=81	10x9=90	11x9=99	12x9=108
7x10=70	8x10=80	9x10=90	10x10=100	11x10=110	12x10=120
7x11=77	8x11=88	9x11=99	10x11=110	11x11=121	12x11=132
7x12=84	8x12=96	9x12=108	10x12=120	11x12=132	12x12=144

Division Table												
÷1	÷2	÷3	÷4	÷5	÷6	÷7	÷8	÷9	÷10	÷11	÷12	
1	2	3	4	5	6	7	8	9	10	11	12	
2	4	6	8	10	12	14	16	18	20	22	24	
3	6	9	12	15	18	21	24	27	30	33	36	
4	8	12	16	20	24	28	32	36	40	44	48	
5	10	15	20	25	30	35	40	45	50	55	60	
6	12	18	24	30	36	42	48	54	60	66	72	
7	14	21	28	35	42	49	56	63	70	77	84	
8	16	24	32	40	48	56	64	72	80	88	96	
9	18	27	36	45	54	63	72	81	90	99	108	
10	20	30	40	50	60	70	80	90	100	110	120	
11	22	33	44	55	66	77	88	99	110	121	132	
12	24	36	48	60	72	84	96	108	120	132	144	

Procedural knowledge

The key method is repeated subtraction on a number line.

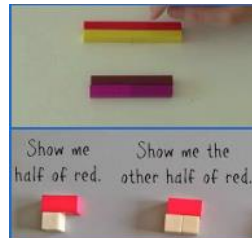
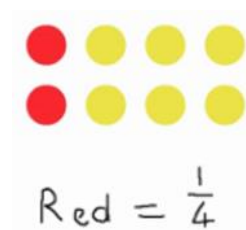
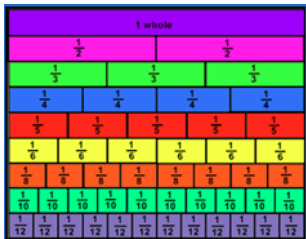




YEAR 3 FRACTIONS

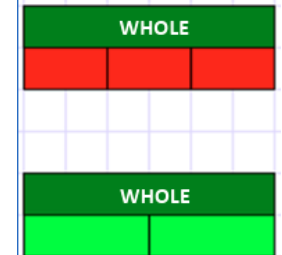
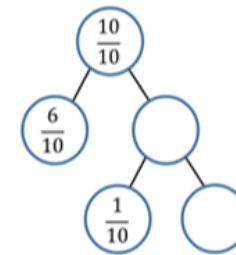
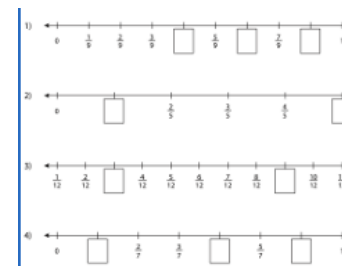
Manipulatives

The recommended manipulatives (physical resources) for Fractions are fraction walls, two-colour counters and Cuisenaire rods.



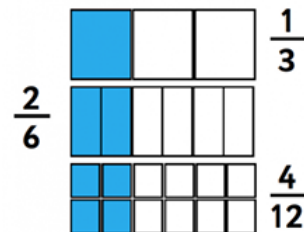
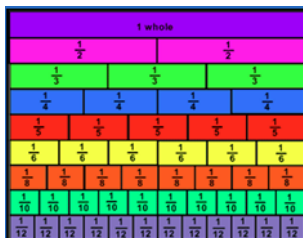
Representations

The key representations are number lines, Part-Part-Whole diagrams and bar models.



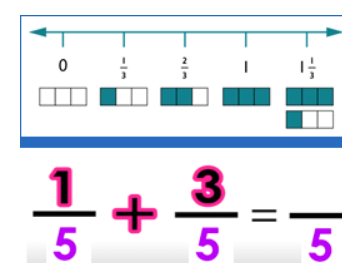
Factual knowledge

The key factual knowledge includes the recall and recognition of equivalent fractions with small denominators using a fraction wall.



Procedural knowledge

The key procedures are counting up/down in fractions on a number line, adding/subtracting fractions and finding fractions of amount.





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Learning Trust
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Calculation Policy: Y4

Mathematical Manipulatives

Key Representations

Progression in Procedures





Key vocabulary

Place value: ones, tens, hundreds, thousands, column, numeral, digit, facts, greater than, less than, equal to, tenth, hundredth, decimal

Addition: sum, addend, add, total, altogether, inverse, commutative, partition

Subtraction: difference, subtrahend, minuend, subtract, partition, difference, inverse

Multiplication: product, multiplicand, multiplier, multiply, multiple, repeated addition, factor, scaling

Division: quotient, dividend, divisor, divide, repeated subtraction, related facts

Fractions: denominator, numerator, equal part, whole, equivalent, ascending, descending, unit fraction, non-unit fraction, tenth, hundredth

Manipulatives: place value counters, Dienes, place value grid

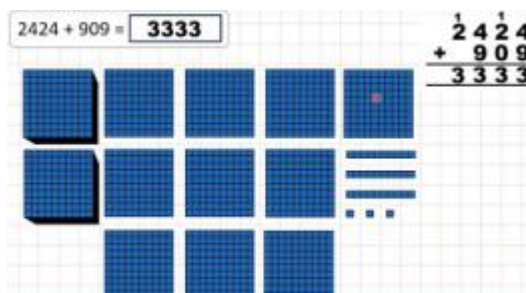
Representations: represent, representation, number line, array, row/column, Part-Part-Whole diagram, bar model



YEAR 4 ADDITION

Manipulatives

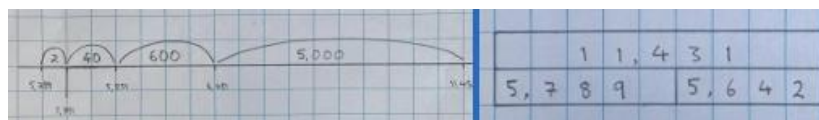
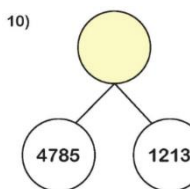
The recommended manipulatives (physical resources) for adding numbers with up to 4-digits are place value counters and Dienes.



Representations

The key representations used are place value grids, number lines, part-part-whole models and bar models. 10)

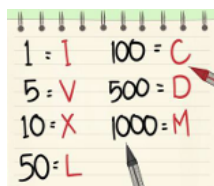
Th	H	T	U	.	$\frac{1}{10}$	$\frac{1}{100}$
Thousands	Hundreds	Tens	Units		Tenths	Hundredths



Factual knowledge

The key factual knowledge includes recall of addition/subtraction facts to 100, doubling/halving facts to 50 and all Roman numerals I-C.

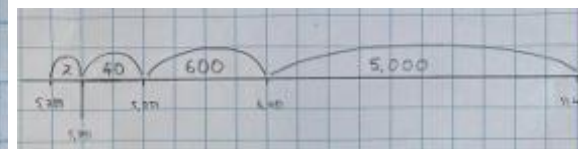
100	
33	
100	26
100	
41	



Procedural knowledge

The key method is formal column addition. Use number lines alongside the formal algorithm to promote flexibility, estimation and decision making (number sense).

5	7	8	9
+	5	6	4
1	1	4	3
1	1	1	

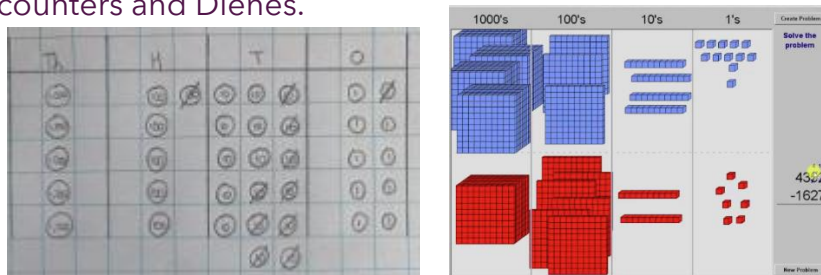




YEAR 4 SUBTRACTION

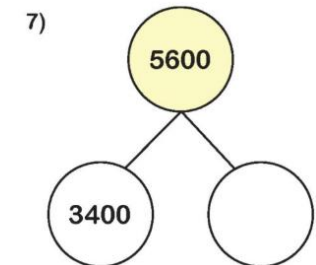
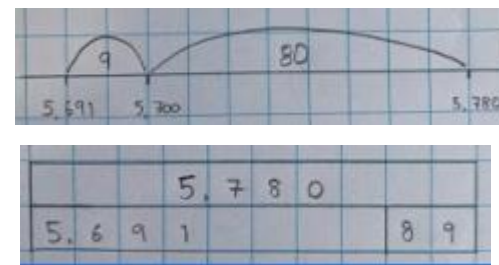
Manipulatives

The recommended manipulatives (physical resources) for subtracting numbers with up to 3-digits are place value counters and Dienes.



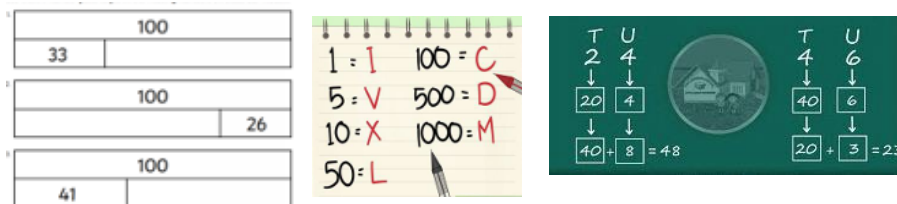
Representations

The key representations used are blank number lines, place value grids, bar models and part-part-whole diagrams.



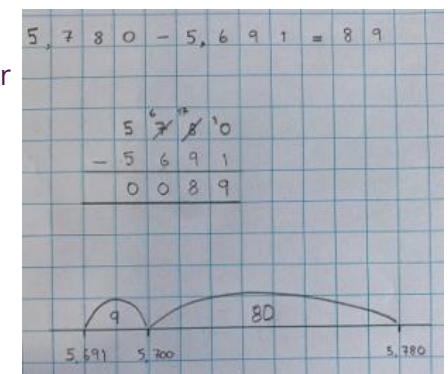
Factual knowledge

The key factual knowledge includes recall of addition/subtraction facts to 100, doubling/halving facts to 50 and all Roman numerals I-C.



Procedural knowledge

The key methods is formal column subtraction. Use number lines alongside the formal algorithm to promote flexibility, estimation and decision making (number sense).

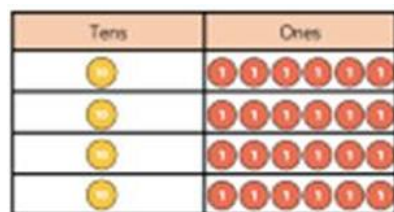




YEAR 4 MULTIPLICATION

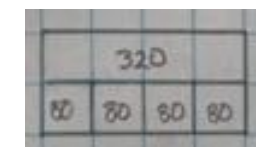
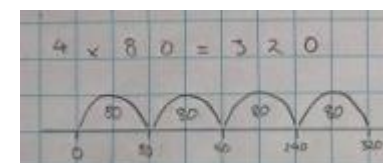
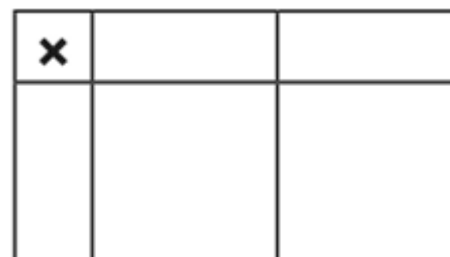
Manipulatives

The recommended manipulatives (physical resources) for multiplying up to 3- digit numbers by 1 digit numbers are place value counters and Dienes.



Representations

The key representations used are blank number lines, bar models and place value grids.



Factual knowledge

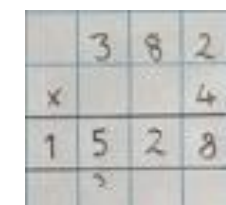
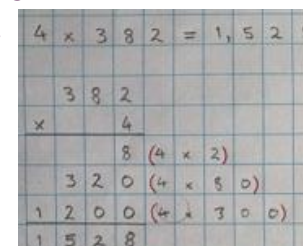
The key factual knowledge includes recall ALL multiplication tables and counting in multiples of 25, 50, 100 and 1000.

x	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

TIMES TABLES					
1x	2x	3x	4x	5x	6x
1x1=1	2x1=2	3x1=3	4x1=4	5x1=5	6x1=6
2x2=4	2x3=6	2x4=8	2x5=10	2x6=12	2x7=14
3x3=9	3x4=12	3x5=15	3x6=18	3x7=21	3x8=24
4x4=16	4x5=20	4x6=24	4x7=28	4x8=32	4x9=36
5x5=25	5x6=30	5x7=35	5x8=40	5x9=45	5x10=50
6x6=36	6x7=42	6x8=48	6x9=54	6x10=60	6x11=66
7x7=49	7x8=56	7x9=63	7x10=70	7x11=77	7x12=84
8x8=64	8x9=72	8x10=80	8x11=88	8x12=96	8x13=104
9x9=81	9x10=90	9x11=99	9x12=108	9x13=117	9x14=126
10x10=100	10x11=110	10x12=120	10x13=130	10x14=140	10x15=150
11x11=121	11x12=132	11x13=143	11x14=154	11x15=165	11x16=176
12x12=144	12x13=156	12x14=168	12x15=180	12x16=192	12x17=204

Procedural knowledge

The key method is the expanded method and formal column multiplication. It is suggested that the children write the calculation alongside the number line to secure conceptual understanding.

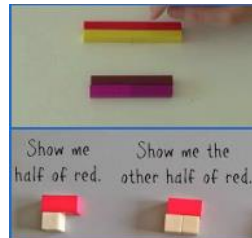
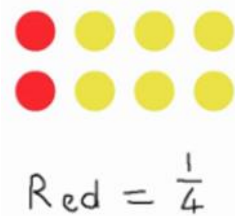
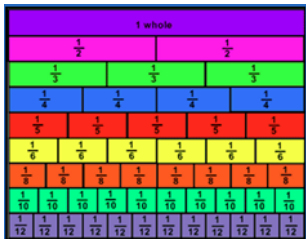




YEAR 4 FRACTIONS

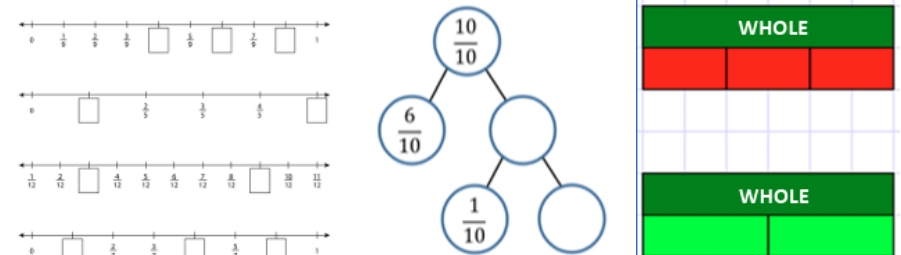
Manipulatives

The recommended manipulatives (physical resources) for Fractions are fraction walls, two-colour counters and Cuisenaire rods.



Representations

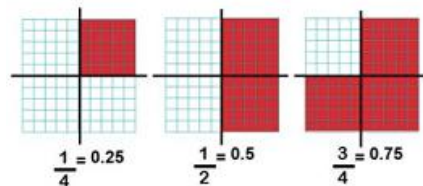
The key representations are number lines, Part-Part-Whole diagrams and bar models.



Factual knowledge

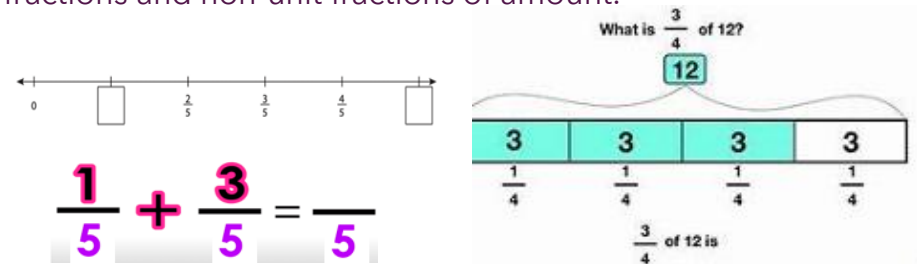
The key factual knowledge includes the recall and recognition of decimal equivalents of $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ and decimal equivalents of any number of tenths/hundredths.

0.1	$\frac{1}{10}$	0.03	$\frac{3}{100}$
0.5	$\frac{5}{10}$	0.08	$\frac{8}{100}$



Procedural knowledge

The key procedures are counting up/down in fractions on a number line, adding/subtracting fractions and finding fractions and non-unit fractions of amount.





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Calculation Policy: Y5

Mathematical Manipulatives

Key Representations

Progression in Procedures





Key vocabulary

Place value: ones, tens, hundreds, thousands, column, numeral, digit, facts, greater than, less than, equal to, consecutive, tenth, hundredth, decimal

Addition: sum, addend, add, total, altogether, inverse, commutative, partition

Subtraction: difference, subtrahend, minuend, subtract, partition, difference, inverse

Multiplication: product, multiplicand, multiplier, multiply, multiple, repeated addition, factor, scaling, composite number

Division: quotient, dividend, divisor, divide, repeated subtraction, related facts, factor

Fractions: denominator, numerator, equal part, whole, equivalent, ascending, descending, unit fraction, non-unit fraction, tenth, hundredth

Manipulatives: place value counters, Dienes, place value grid

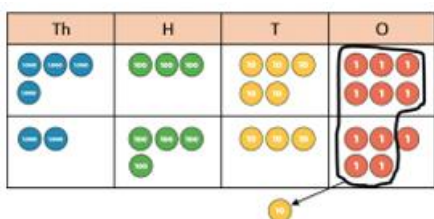
Representations: represent, representation, number line, array, row/column, Part-Part-Whole diagram, bar model



YEAR 5 ADDITION

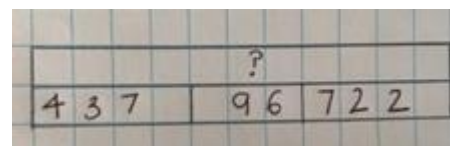
Manipulatives

The recommended manipulatives (physical resources) for adding numbers with more than 4- digits are place value counters and Dienes. This should build on prior knowledge..



Representations

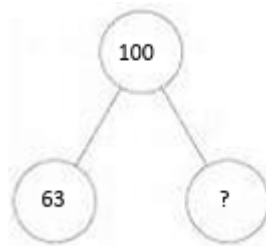
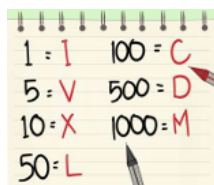
The key representations used are place value grids, bar models and part-part-whole diagrams (which encourage children to apply their knowledge of place value).



Factual knowledge

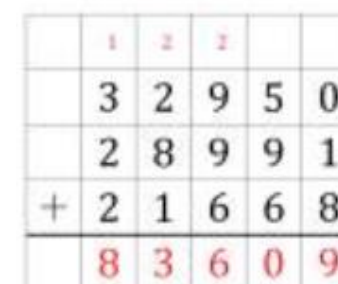
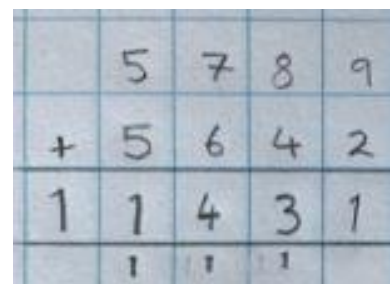
The key factual knowledge includes recall of addition/subtraction facts to 100 and doubling/halving facts to 100 and Roman Numerals I-M.

100	
33	
100	
	26
100	
41	



Procedural knowledge

The key methods is formal column addition.



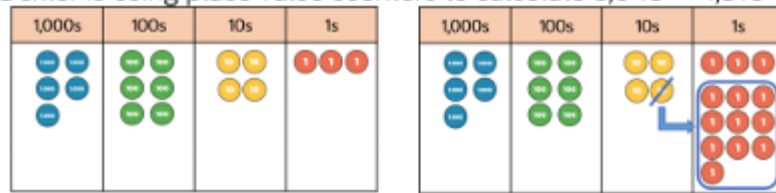


YEAR 5 SUBTRACTION

Manipulatives

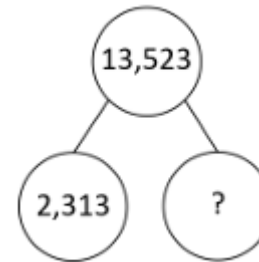
The recommended manipulatives (physical resources) for subtracting numbers with more than 4-digits are place value counters and Dienes.

Dexter is using place value counters to calculate $5,643 - 4,316$



Representations

The key representations used are blank number lines, place value grids, bar models and part-part-whole diagrams.



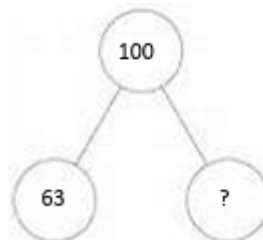
8,435		
367	579	?

Factual knowledge

The key factual knowledge includes recall of addition/subtraction facts to 100 and doubling/halving facts to 100 and Roman Numerals I-M.

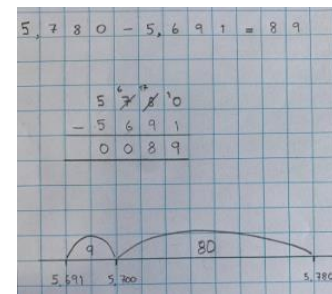
100
33
100
26
100
41

1 = I	100 = C
5 = V	500 = D
10 = X	1000 = M
50 = L	



Procedural knowledge

The key methods is formal column subtraction



	Th	H	T	O
	5	6	34	13
-	4	3	1	6
	1	3	2	7



KEY VOCABULARY: product, multiplicand, multiplier, multiply, multiple, repeated addition, factor, scaling, composite number, prime, squared, cubed



YEAR 5 DIVISION

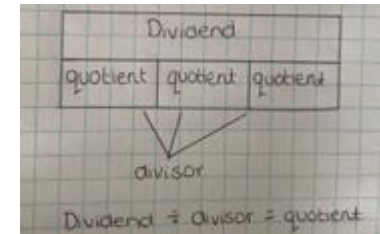
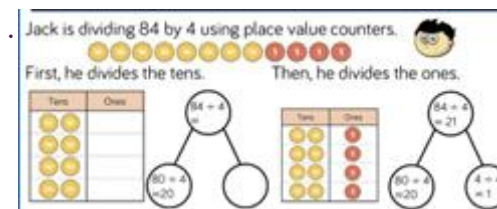
Manipulatives

The recommended manipulatives (physical resources) for Division are place value counters and Dienes.



Representations

The key method is repeated subtraction on a number line. And continue to group and share concrete objects, use pictorial representations and arrays.



Factual knowledge

The key factual knowledge includes recall of 2, 3, 4, 5, 8 and 10 multiplication tables and counting in multiples of 50 and 100. Find effect of dividing 1 or 2 digit number by 10 or 100.

1x

2x

3x

4x

5x

6x

7x

8x

9x

10x

11x

12x

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36
37	38	39	40	41	42
43	44	45	46	47	48
49	50	51	52	53	54
55	56	57	58	59	60
61	62	63	64	65	66
67	68	69	70	71	72
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79	80	81	82	83	84
85	86	87	88	89	90
91	92	93	94	95	96
97	98	99	100	101	102
103	104	105	106	107	108
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859	860	861	862	863	864
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949	950	951	952	953	954
955	956	957	958	959	960
961	962	963	964	965	966
967	968	969	970	971	972
973	974	975	976	977	978
979	980	981	982	983	984
985	986	987	988	989	990
991	992	993	994	995	996
997	998	999	1000	1001	1002
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1009	1010	1011	1012	1013	1014
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1093	1094	1095	1096	1097	1098
1099	1100	1101	1102	1103	1104
1105	1106	1107	1108	1109	1110
1111	1112	1113	1114	1115	1116
1117	1118	1119	1120	1121	1122
1123	1124	1125	1126	1127	1128
1129	1130	1131	1132	1133	1134
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1141	1142	1143	1144	1145	1146
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1297	1298	1299	1300	1301	1302
1303	1304	1305	1306	1307	1308
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1351	1352	1353	1354	1355	1356
1357	1358	1359	1360	1361	1362
1363	1364	1365	1366	1367	1368
1369	1370	1371	1372	1373	1374
1375	1376	1377	1378	1379	1380
1381	1382	13			



YEAR 5 FRACTIONS

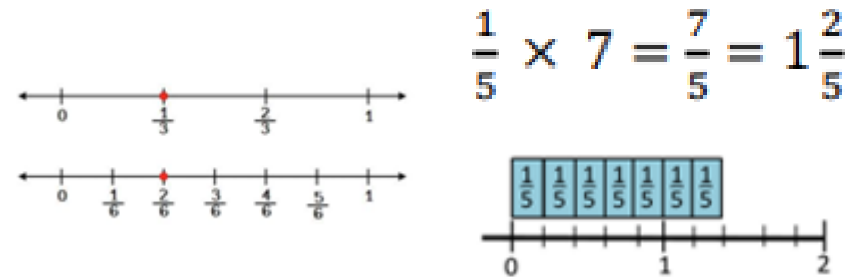
Manipulatives

The recommended manipulatives (physical resources) for Fractions are fraction walls, two-colour counters and Cuisenaire rods.



Representations

The key representations are number lines, Part-Part-Whole diagrams and bar models.



Factual knowledge

The key factual knowledge includes the recall and recognition of equivalent fractions (whose denominators are multiples of the same number); writing decimal numbers as fractions.

$$\begin{aligned} \frac{1}{2} &= \frac{2}{4} = \frac{3}{6} = \frac{4}{8} \\ \frac{1}{3} &= \frac{2}{6} = \frac{3}{9} = \frac{4}{12} \\ \frac{1}{5} &= \frac{2}{10} = \frac{3}{15} = \frac{4}{20} \end{aligned}$$

[for example, $0.71 = \frac{71}{100}$]

Procedural knowledge

The key procedures are converting between mixed numbers and fractions, adding/subtracting fractions with different denominators and **multiplying fractions by integers**.

$\frac{3}{4} \times 4 = \frac{12}{4} = 3$

$\frac{15}{20} + \frac{16}{20} = \frac{31}{20}$

$2 \frac{3}{4} = \frac{(4 \times 2) + 3}{4} = \frac{11}{4}$



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Calculation Policy: Y6

Mathematical Manipulatives

Key Representations

Progression in Procedures





Key vocabulary

Place value: ones, tens, hundreds, thousands, column, numeral, digit, facts, greater than, less than, equal to, consecutive, tenth, hundredth, decimal

Addition: sum, addend, add, total, altogether, inverse, commutative, partition

Subtraction: difference, subtrahend, minuend, subtract, partition, difference, inverse

Multiplication: product, multiplicand, multiplier, multiply, multiple, repeated addition, factor, scaling, composite number

Division: quotient, dividend, divisor, divide, repeated subtraction, related facts, factor, bisect

Fractions: denominator, numerator, equal part, whole, equivalent, ascending, descending, unit fraction, non-unit fraction, tenth, hundredth

Manipulatives: place value counters, Dienes, place value grid

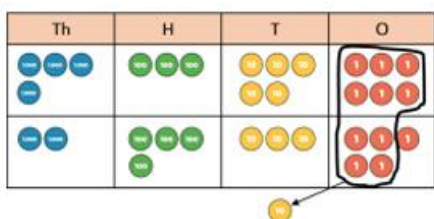
Representations: represent, representation, number line, array, row/column, Part-Part-Whole diagram, bar model



YEAR 6 ADDITION

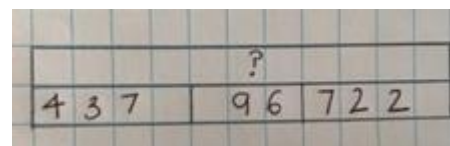
Manipulatives

The recommended manipulatives (physical resources) for adding numbers with more than 4- digits are place value counters and Dienes. This should build on prior knowledge..



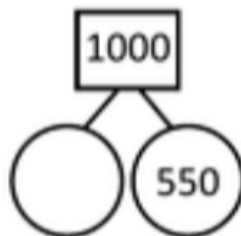
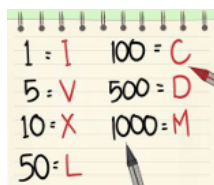
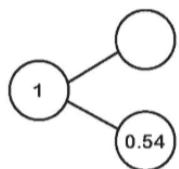
Representations

The key representations used are place value grids, bar models and part-part-whole diagrams (which encourage children to apply their knowledge of place value).



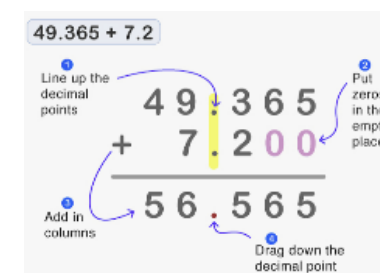
Factual knowledge

The key factual knowledge includes recall of addition/subtraction facts to 100 and doubling/halving facts to 100 and Roman Numerals I-M.



Procedural knowledge

The key methods is formal column addition.

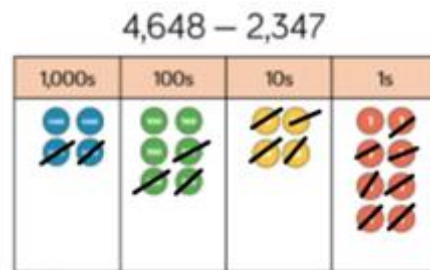




YEAR 6 SUBTRACTION

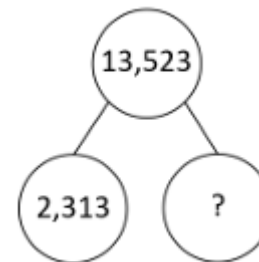
Manipulatives

The recommended manipulatives (physical resources) for subtracting numbers with more than 4-digits are place value counters and Dienes.



Representations

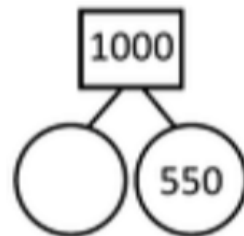
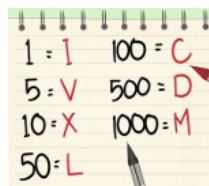
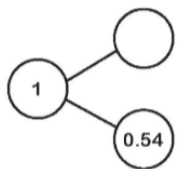
The key representations used are blank number lines, place value grids, bar models and part-part-whole diagrams.



part		part	
34 226		6 099	

Factual knowledge

The key factual knowledge includes recall of addition/subtraction facts to 100 and doubling/halving facts to 100 and Roman Numerals I-M.



Procedural knowledge

The key methods is formal column subtraction

	Th	H	T	O
	5	6	34	13
-	4	3	1	6
	1	3	2	7

Tens	Ones	Tenths	Hundredths
	2	0	0
-	0	8	5
	1	1	5

Placeholders

Answer



YEAR 6 MULTIPLICATION

Manipulatives

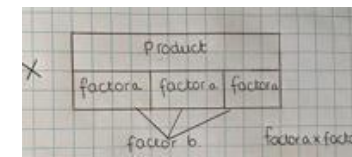
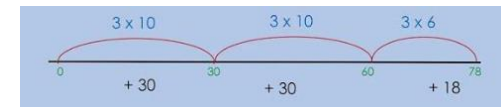
The recommended manipulatives (physical resources) for multiplying numbers with up to 4- digits are place value counters and Dienes.

Annie earns £1,325 per week.
How much would he earn in 4 weeks?

Thousands	Hundreds	Tens	Ones
1	3	2	5
1	3	2	5
1	3	2	5
1	3	2	5

Representations

The key representations used are blank number lines, bar models and place value grids.



Factual knowledge

The key factual knowledge includes recall ALL multiplication tables.

x	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

TIMES TABLES					
1x	2x	3x	4x	5x	6x
1x1=1	2x1=2	3x1=3	4x1=4	5x1=5	6x1=6
1x2=2	2x2=4	3x2=6	4x2=8	5x2=10	6x2=12
1x3=3	2x3=6	3x3=9	4x3=12	5x3=15	6x3=18
1x4=4	2x4=8	3x4=12	4x4=16	5x4=20	6x4=24
1x5=5	2x5=10	3x5=15	4x5=20	5x5=25	6x5=30
1x6=6	2x6=12	3x6=18	4x6=24	5x6=30	6x6=36
1x7=7	2x7=14	3x7=21	4x7=28	5x7=35	6x7=42
1x8=8	2x8=16	3x8=24	4x8=32	5x8=40	6x8=48
1x9=9	2x9=18	3x9=27	4x9=36	5x9=45	6x9=54
1x10=10	2x10=20	3x10=30	4x10=40	5x10=50	6x10=60
1x11=11	2x11=22	3x11=33	4x11=44	5x11=55	6x11=66
1x12=12	2x12=24	3x12=36	4x12=48	5x12=60	6x12=72
2x	3x	4x	5x	6x	7x
2x1=2	3x1=3	4x1=4	5x1=5	6x1=6	7x1=7
2x2=4	3x2=6	4x2=8	5x2=10	6x2=12	7x2=14
2x3=6	3x3=9	4x3=12	5x3=15	6x3=18	7x3=21
2x4=8	3x4=12	4x4=16	5x4=20	6x4=24	7x4=28
2x5=10	3x5=15	4x5=20	5x5=25	6x5=30	7x5=35
2x6=12	3x6=18	4x6=24	5x6=30	6x6=36	7x6=42
2x7=14	3x7=21	4x7=28	5x7=35	6x7=42	7x7=49
2x8=16	3x8=24	4x8=32	5x8=40	6x8=48	7x8=56
2x9=18	3x9=27	4x9=36	5x9=45	6x9=54	7x9=63
2x10=20	3x10=30	4x10=40	5x10=50	6x10=60	7x10=70
2x11=22	3x11=33	4x11=44	5x11=55	6x11=66	7x11=77
2x12=24	3x12=36	4x12=48	5x12=60	6x12=72	7x12=84
3x	4x	5x	6x	7x	8x
3x1=3	4x1=4	5x1=5	6x1=6	7x1=7	8x1=8
3x2=6	4x2=8	5x2=10	6x2=12	7x2=14	8x2=16
3x3=9	4x3=12	5x3=15	6x3=18	7x3=21	8x3=24
3x4=12	4x4=16	5x4=20	6x4=24	7x4=28	8x4=32
3x5=15	4x5=20	5x5=25	6x5=30	7x5=35	8x5=40
3x6=18	4x6=24	5x6=30	6x6=36	7x6=42	8x6=48
3x7=21	4x7=28	5x7=35	6x7=42	7x7=49	8x7=56
3x8=24	4x8=32	5x8=40	6x8=48	7x8=56	8x8=64
3x9=27	4x9=36	5x9=45	6x9=54	7x9=63	8x9=72
3x10=30	4x10=40	5x10=50	6x10=60	7x10=70	8x10=80
3x11=33	4x11=44	5x11=55	6x11=66	7x11=77	8x11=88
3x12=36	4x12=48	5x12=60	6x12=72	7x12=84	8x12=96
4x	5x	6x	7x	8x	9x
4x1=4	5x1=5	6x1=6	7x1=7	8x1=8	9x1=9
4x2=8	5x2=10	6x2=12	7x2=14	8x2=16	9x2=18
4x3=12	5x3=15	6x3=18	7x3=21	8x3=24	9x3=27
4x4=16	5x4=20	6x4=24	7x4=28	8x4=32	9x4=36
4x5=20	5x5=25	6x5=30	7x5=35	8x5=40	9x5=45
4x6=24	5x6=30	6x6=36	7x6=42	8x6=48	9x6=54
4x7=28	5x7=35	6x7=42	7x7=49	8x7=56	9x7=63
4x8=32	5x8=40	6x8=48	7x8=56	8x8=64	9x8=72
4x9=36	5x9=45	6x9=54	7x9=63	8x9=72	9x9=81
4x10=40	5x10=50	6x10=60	7x10=70	8x10=80	9x10=90
4x11=44	5x11=55	6x11=66	7x11=77	8x11=88	9x11=99
4x12=48	5x12=60	6x12=72	7x12=84	8x12=96	9x12=108
5x	6x	7x	8x	9x	10x
5x1=5	6x1=6	7x1=7	8x1=8	9x1=9	10x1=10
5x2=10	6x2=12	7x2=14	8x2=16	9x2=18	10x2=20
5x3=15	6x3=18	7x3=21	8x3=24	9x3=27	10x3=30
5x4=20	6x4=24	7x4=28	8x4=32	9x4=36	10x4=40
5x5=25	6x5=30	7x5=35	8x5=40	9x5=45	10x5=50
5x6=30	6x6=36	7x6=42	8x6=48	9x6=54	10x6=60
5x7=35	6x7=42	7x7=49	8x7=56	9x7=63	10x7=70
5x8=40	6x8=48	7x8=56	8x8=64	9x8=72	10x8=80
5x9=45	6x9=54	7x9=63	8x9=72	9x9=81	10x9=90
5x10=50	6x10=60	7x10=70	8x10=80	9x10=90	10x10=100
5x11=55	6x11=66	7x11=77	8x11=88	9x11=99	10x11=110
5x12=60	6x12=72	7x12=84	8x12=96	9x12=108	10x12=120
6x	7x	8x	9x	10x	11x
6x1=6	7x1=7	8x1=8	9x1=9	10x1=10	11x1=11
6x2=12	7x2=14	8x2=16	9x2=18	10x2=20	11x2=22
6x3=18	7x3=21	8x3=24	9x3=27	10x3=30	11x3=33
6x4=24	7x4=28	8x4=32	9x4=36	10x4=40	11x4=44
6x5=30	7x5=35	8x5=40	9x5=45	10x5=50	11x5=55
6x6=36	7x6=42	8x6=48	9x6=54	10x6=60	11x6=66
6x7=42	7x7=49	8x7=56	9x7=63	10x7=70	11x7=77
6x8=48	7x8=56	8x8=64	9x8=72	10x8=80	11x8=88
6x9=54	7x9=63	8x9=72	9x9=81	10x9=90	11x9=99
6x10=60	7x10=70	8x10=80	9x10=90	10x10=100	11x10=110
6x11=66	7x11=77	8x11=88	9x11=99	10x11=110	11x11=121
6x12=72	7x12=84	8x12=96	9x12=108	10x12=120	11x12=132
7x	8x	9x	10x	11x	12x
7x1=7	8x1=8	9x1=9	10x1=10	11x1=11	12x1=12
7x2=14	8x2=16	9x2=18	10x2=20	11x2=22	12x2=24
7x3=21	8x3=24	9x3=27	10x3=30	11x3=33	12x3=36
7x4=28	8x4=32	9x4=36	10x4=40	11x4=44	12x4=48
7x5=35	8x5=40	9x5=45	10x5=50	11x5=55	12x5=60
7x6=42	8x6=48	9x6=54	10x6=60	11x6=66	12x6=72
7x7=49	8x7=56	9x7=63	10x7=70	11x7=77	12x7=84
7x8=56	8x8=64	9x8=72	10x8=80	11x8=88	12x8=96
7x9=63	8x9=72	9x9=81	10x9=90	11x9=99	12x9=108
7x10=70	8x10=80	9x10=90	10x10=100	11x10=110	12x10=120
7x11=77	8x11=88	9x11=99	10x11=110	11x11=121	12x11=132
7x12=84	8x12=96	9x12=108	10x12=120	11x12=132	12x12=144

Procedural knowledge

The key methods are grid method and formal column multiplication.

x	40	4
30	1,200	120
2	80	8

TTh	Th	H	T	O
	2	7	3	9
x			2	8
2	1	9	1	2
5	4	7	8	0
7	6	6	9	2

3	1	9
x	8	
2	5	5
1	7	2



YEAR 6 DIVISION

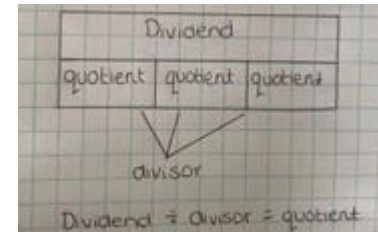
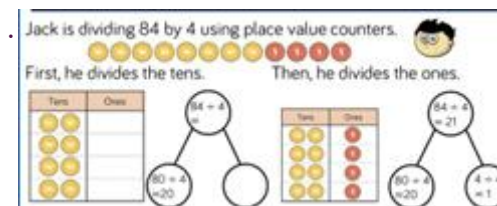
Manipulatives

The recommended manipulatives (physical resources) for Division are place value counters and Dienes.



Representations

The key method is repeated subtraction on a number line. And continue to group and share concrete objects, use pictorial representations and arrays.



Factual knowledge

The key factual knowledge includes recall of 2, 3, 4, 5, 8 and 10 multiplication tables and counting in multiples of 50 and 100. Find effect of dividing 1 or 2 digit number by 10 or 100.



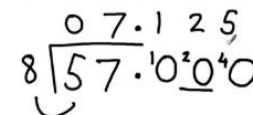
If $\frac{1}{2} = 1 \div 2$ then $\frac{1}{4} = 1 \div 4$

Procedural knowledge

The key method is short division.



Division: Leaving
Remainders as Decimals



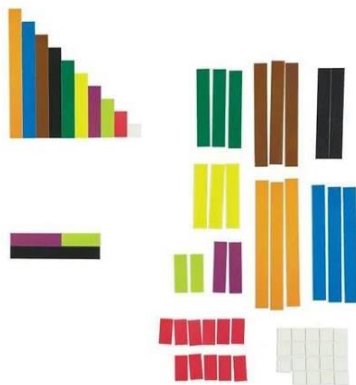
	0	4	8	9	
15	7	3	3	5	
-	6	0	0	0	(x400)
	1	3	3	5	
-	1	2	0	0	(x80)
		1	3	5	
-		1	3	5	(x9)
				0	



YEAR 6 FRACTIONS

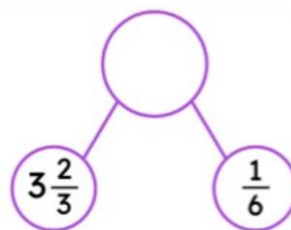
Manipulatives

The recommended manipulatives (physical resources) for Fractions are fraction walls, counters and Cuisenaire rods.



Representations

The key representations are number lines, Part-Part-Whole diagrams and bar models.



$$\frac{1}{2} \text{ of } 24 = 12$$

$$\frac{1}{4} \text{ of } 24 = 6$$

$$\frac{3}{4} \text{ of } 24 = 18$$

Factual knowledge

The key factual knowledge includes the recall and recognition of equivalent fractions using common multiples (generation) and common factors (simplification), recall common FDP equivalences and associate a fraction with the division equation.

0.5	50%	$\frac{1}{2}$
0.25	25%	$\frac{1}{4}$
0.1	10%	$\frac{1}{10}$
0.01	1%	$\frac{1}{100}$

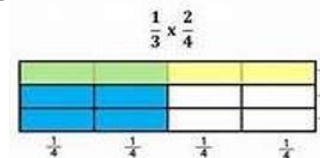
$$\frac{1}{2} = \frac{2}{4} = \frac{3}{6}$$

$$\frac{1}{3} = \frac{2}{6} = \frac{3}{9}$$

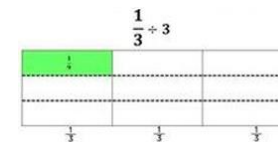
$$\frac{1}{5} = \frac{2}{10} = \frac{3}{15}$$

Procedural knowledge

The key procedures are ordering fractions >1 , adding/subtracting fractions including mixed numbers, multiplying pairs of proper fractions, dividing fractions by an integer.



$$\frac{2}{4} \times \frac{3}{6} = \frac{6}{24}$$



$$\frac{5}{3} \div \frac{2}{9} = \frac{5}{3} \times \frac{9}{2} = \frac{45}{6} = \frac{15}{2}$$